

Developing a web application to improve communication at a software company.

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LIST OF ABBREVIATIONS

EU	European Union (Abbreviation)
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Appendix A: Documentation

A.1. Description of the artefact

This study proposes the development of a communication web application that can easily be viewed in an office by all employees to allow easy access to important communication regarding specific software development projects. Where the primary objective is to develop a web application for a South African software development company that allows for easy access to important communication relating to specific project.

The design of the artefact has to satisfy the requirements as set out in Chapter 4, the suggestion phase. Along with the requirements and specifications, the artefact also followed the human-computer interaction rules to provide the best user experience as discussed in Chapter 3 of this study.

A.2. The life cycle followed and its different phases

With regards to Design Science Research this study used the Vaishnavi process model. The process model established the design as a coherent discipline (Mohammad Abooyee Ardakan, 2009) and aided to establish in what phase the project is at any given time.

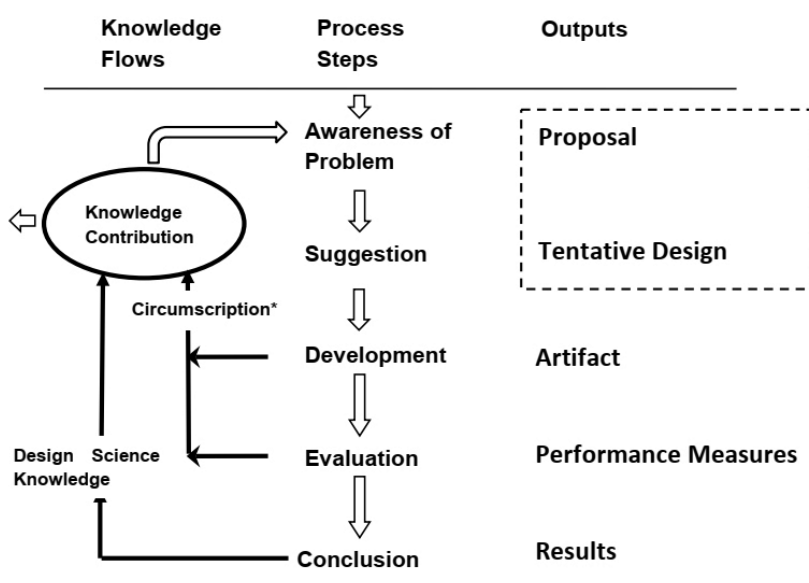


Figure A.1: Vaishnavi Process Model (Vijay Vaishnavi, 2004)

The figure represents the process model by Vijay Vaishnavi (2004) and entails awareness of the problem, suggestion, development, evaluation, conclusion and will be discussed next.

(i) Awareness of problem

Multiple sources can be used for an awareness of a research problem. This includes identifying problems in a reference discipline or a new development in the industry. Part of this phase is becoming aware of the main problem and considering criteria for evaluating the artefact when it is done.

This study proposes to develop an artifact that will allow project managers and project developers to have access to a way of communicating and to access important information during the day with ease. The criterion for a successful artefact is a web application that enhances communication.

(ii) Suggestion

This phase is where new functionality is envisioned. Non-repeatability has been criticized in this phase of the design science research method. A Tentative Design of a prototype forms part of the proposal if approved by the researcher. In all research methods, this creativity step has necessary analogs, as it creates curiosity to develop an artefact.

The artefact needs to be built according to what the end user expects, this phase of the study is there to define the requirements properly and do an analysis on what is intended for the artefact. In this phase it was established with the use of open coding, that the most common requirements and specifications were easy communication method, improve productivity, artefact should focus on communication between employees and about their project, create a relaxed environment, and the user experience comes first.

After the data analysis the most important requirements and specifications was identified and is shown in Table A.1 below.

Table A.1: Most important requirements and specifications

Most important requirements and specifications	
Number	Requirement or specification
1.	Improve communication.
2.	Improved productivity.
3.	Artefact should focus on communication between employees and communication about the project.
4.	Create a relaxed environment.
5.	The user experience comes first.

(iii) Development

If the Tentative Design is approved by the researcher further development and implementation take place in this phase. Implementation techniques will depend on the artefact that will be created. Formal proof may be needed to show the correctness of the design, for example constructing an algorithm.

Table A.2. below shows the requirements or specifications and how it will be solved with the use of the built artefact.

1. Table A.2: Most important requirements and specifications

Most important requirements and specifications		
#	Requirement or specification	How it is solved in the artefact
1.	Improve communication.	By combining different methods of communication as discussed in Chapter 2 of this study. For the Artefact the communication methods that was focused

		<p>on was instant messages and Issue queues. For this study a new "Chat" feature was developed, this is to satisfy the need for an instant messaging feature. There was also a new "Drag and drop" feature developed where users can add items to a "To Do" list and move the item to either "Doing" or "Done", this was added to satisfy the need for an Issue queues feature.</p>
2.	Improved productivity.	<p>For a project overview, a member of a team will be able to see an overview of their team under a feature named "My Team". The feature will also provide important information on their team such as employee numbers, member status, member name and surname, member email, what the member is busy with and when last they were online. This will satisfy the need for improving productivity as a team as they are always aware of what they whole team is busy with.</p>
3.	Artefact should focus on communication between employees and communication about the project.	<p>Not only can users communicate with each other, but they can also get the necessary information about their project. For this artefact, an "Activities" feature was added. The Activities feature provides information on the backlog of the project, this includes the name, category, importance, and the status of the activity. Each activity can be edited at any moment as well as a bulk</p>

		<p>action to either archive or delete the actions, this will also improve productivity as less time is spent on the actual artefact and more time on the project. An analytics page is also added to the artefact to give information on the overall project, this includes "Sales Stats", "Activity Timeline" and "Project Timeline". This will provide a more long-term plan for the project.</p>
4.	Create a relaxed environment.	<p>A new calendar feature was developed for the artefact. The calendar can be viewed as either "Monthly", "Weekly" or "Yearly". This creates a more flexible way of planning the project and everyone in the team can contribute to events. The team can also tag each event with "Business", "Work", "Personal" or "None". They can also add a "URL" to an event, this can include a "Zoom" meeting link, "YouTube" link or any important link needed for the event. This will improve the structure of the project and make members of the team more relaxed knowing that every event is planned out.</p>
5.	The user experience comes first.	<p>By using pre-emptive dialog, users will make minimal errors when working with the artefact. This includes the ten human-computer interaction rules discussed in Chapter 3. This includes having validation on each input of the user, having loading elements if the user has to wait for data to</p>

		be retrieved as well as having the ability to change something that they saved incorrectly.
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The design of the artefact is based on the most important requirements and specifications shown in Table A.1. The next section of the study will visually explain how each of the requirements or specification was implemented with the use of screenshots and explaining some of the features that was added and how to use them.

Improve communication

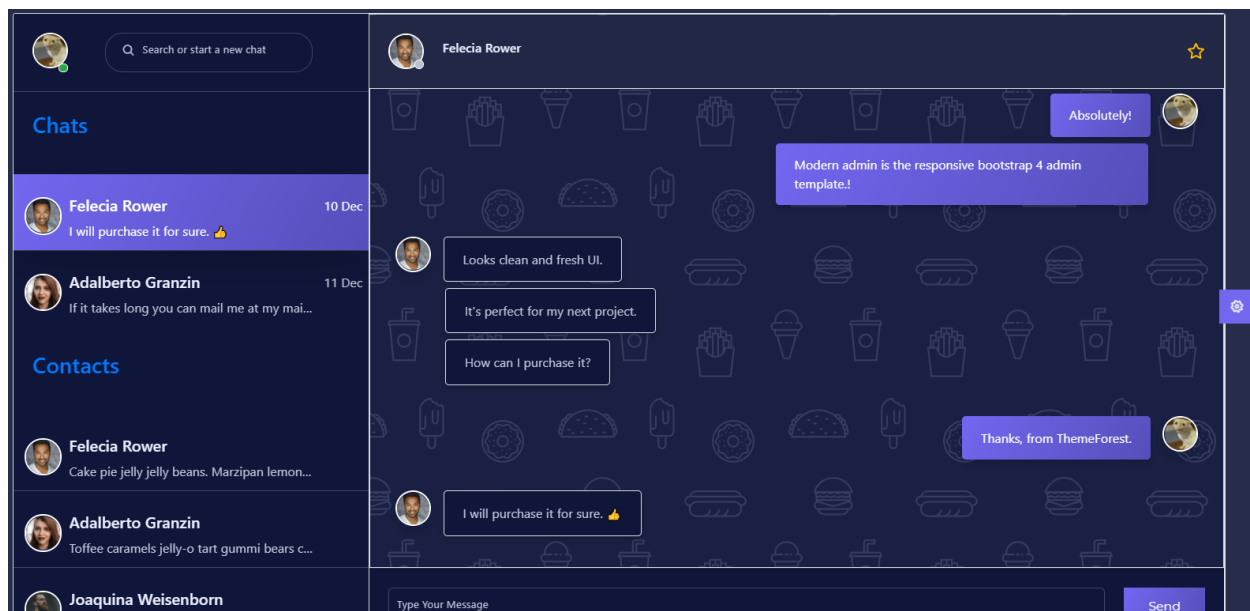


Figure 1: Instant messages

Figure 1 shows the chat feature that was added to the artefact, each member will be able to see their “Chats” on the left of their screens as well as all their team members. On the right side of their screens, they will be able to see their “Chat” as well as be able to send messages to other members of their teams. The “Chat” was added to support the need for an instant messenger feature where members of a team will be able to communicate with each other.

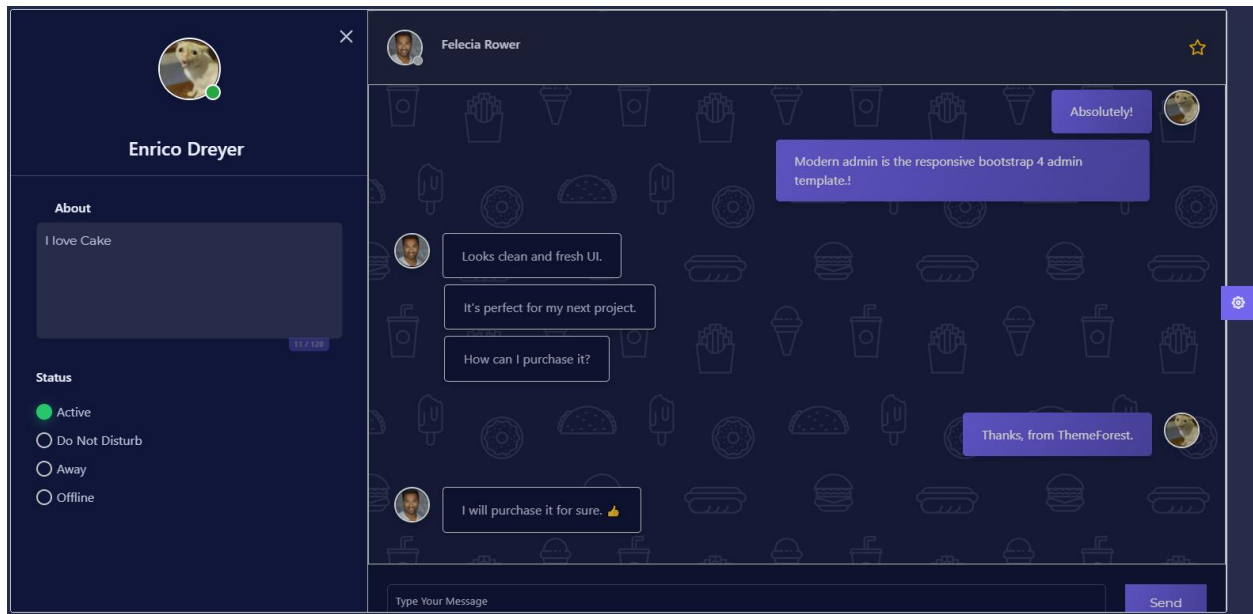


Figure 2: Instant messages Profile

When clicking on your own user profile, you will be able add an “about” that is linked to your profile as well as change your profile status to either “Active”, “Do Not Disturb”, “Away” or “Offline” as shown in figure 2.

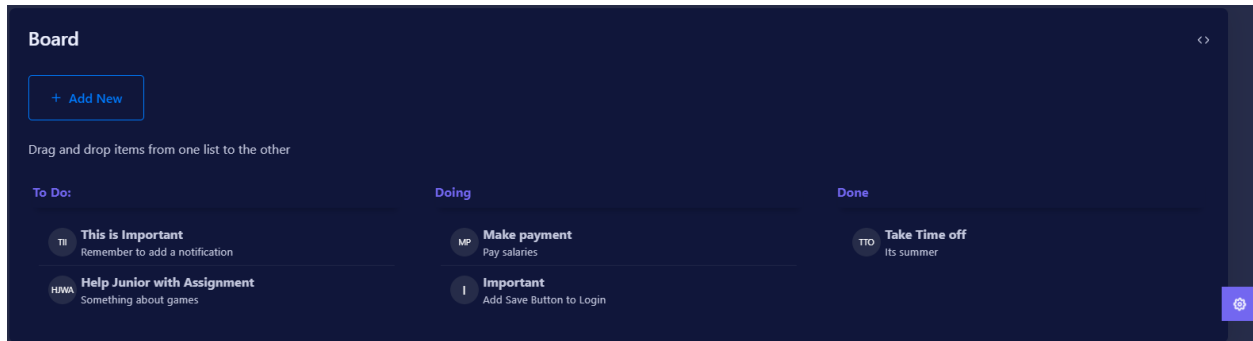


Figure 3: Issue queues

The artefact also focused on Issue queues as another way of communication. As shown in Figure 3, a user can add items to the “To Do” list by clicking on the “Add New” button that will prompt a popup asking them for the detail of the item that they want to add. The user can then move the items to one of the three lists (“To Do”, “Doing”, and “Done”). This feature improves the flow of activities being done in the project, as well as assist in organizing what needs to be done.

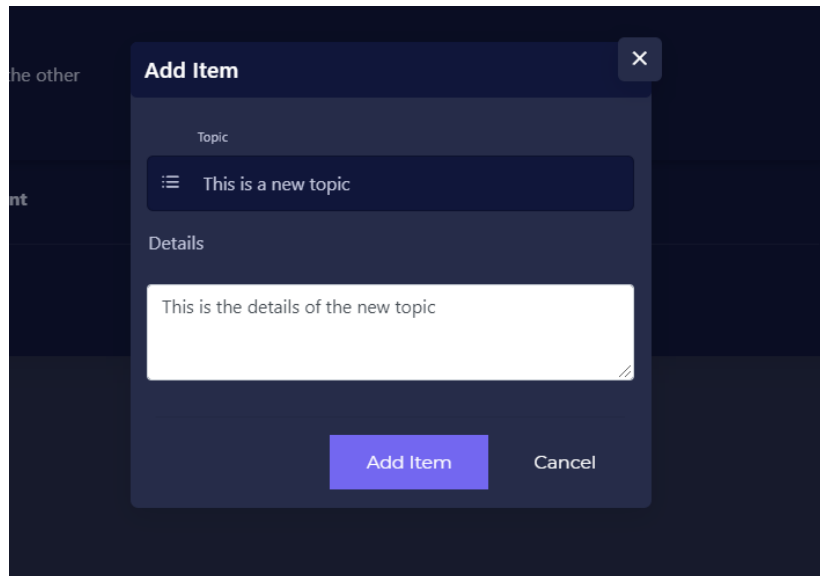


Figure 4: New issue queue pop-up

As shown in Figure 4, the user can add a new item to the drag and drop. The user is obligated to add a topic to the item, along with the details of the item that is added. When the item is added it will display in the “To Do” list.

Improve productivity





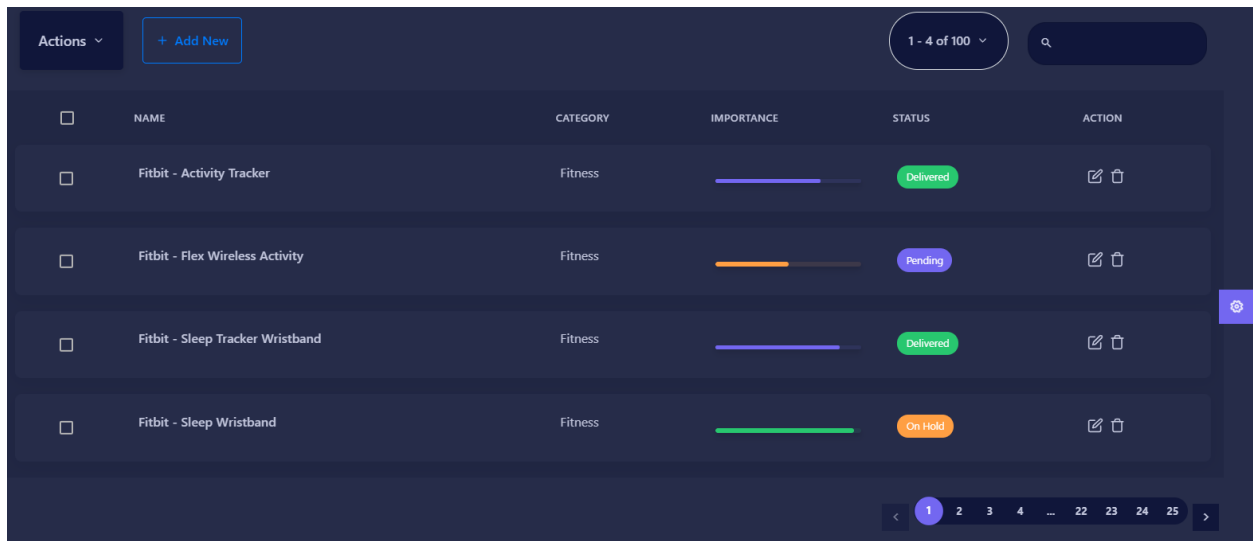
My Team					
EMPLOYEE NO.	STATUS	NAME AND SURNAME	EMAIL	BUSY WITH	LAST ONLINE
#1	Active	 Cinar Knowles	cinarknowles@gmail.com	Anniston, Alabama	26/07/2018
#2	Do Not Disturb	 Britany Ryder	britanyryder@gmail.com	Cordova, Alaska	26/07/2018
#3	Away	 Kishan Ashton	kishanashton@gmail.com	Florence, Alabama	26/07/2018
#4	Offline	 Anabella Elliott	anabellaelliott.com	Clifton, Arizona	26/07/2018

Figure 5: Team detail

Figure 5 displays information on the team and what they are busy with. This includes seeing the employee number, status, name and surname, email and when they were last online. As a team you work together to reach a common goal, by sharing the information on what each team member is busy with allows for easier sharing of the workload, thus reducing the pressure of each individual (Wehbe, 2017). This feature allows the user to get a broad overview on what is going on in the project. Having a team members email is beneficial for it allows them to have a different communication method if the team member is offline.

Focus on both communication between employees but also about project



The screenshot displays a web application interface for managing activities. At the top, there is a header bar with a dark blue background. On the left, there is a dropdown menu labeled 'Actions' and a button labeled '+ Add New'. On the right, there is a search bar and a dropdown menu showing '1 - 4 of 100'. Below the header, there is a table with five columns: 'NAME', 'CATEGORY', 'IMPORTANCE', 'STATUS', and 'ACTION'. The table contains five rows of data, each representing a different activity. Each row has a checkbox on the left and two icons (edit and delete) on the right. The 'IMPORTANCE' column shows a progress bar for each activity. The 'STATUS' column shows a colored pill with the status name. The 'ACTION' column shows edit and delete icons. At the bottom right, there is a pagination bar showing page numbers 1, 2, 3, 4, ..., 22, 23, 24, 25.

	NAME	CATEGORY	IMPORTANCE	STATUS	ACTION
<input type="checkbox"/>	Fitbit - Activity Tracker	Fitness	<div><div></div></div>	Delivered	
<input type="checkbox"/>	Fitbit - Flex Wireless Activity	Fitness	<div><div></div></div>	Pending	
<input type="checkbox"/>	Fitbit - Sleep Tracker Wristband	Fitness	<div><div></div></div>	Delivered	
<input type="checkbox"/>	Fitbit - Sleep Wristband	Fitness	<div><div></div></div>	On Hold	

Figure 6: Project Detail

Figure 6 shows the list of activities that can be added by a user. Each activity consists of a name, category, importance, and a status. Each activity can be either edited or deleted. A user can add a new activity by clicking the “Add New” button, this will prompt a separate component on the right side of the screen. The user can also select multiple activities and choose to either delete or archive the action. A user can also search their activities by using the search function on the top right, along with picking how many activities they want to see at a time.

The image shows a dark-themed user interface. On the left, a table lists activities with columns 'CATEGORY' and 'IMPORTANCE'. The 'CATEGORY' column contains the word 'Fitness' for all visible rows. The 'IMPORTANCE' column shows horizontal progress bars of different colors (purple, orange, green). On the right, an 'UPDATE ITEM' modal is open. It contains the following fields: a text input for 'Name' with the value 'Fitbit - Activity Tracker'; a dropdown for 'Category' set to 'Fitness'; a dropdown for 'Importance' set to 'Fitness'; and a dropdown for 'Status' set to 'Delivered'. At the bottom of the modal are two buttons: a blue 'Submit' button and a red-outlined 'Cancel' button.

Figure 7: Component for updating or adding an activity

Figure 7 shows the component for adding or updating an Activity. Users can select a “name”, “category”, “importance”, and “status” on this component. After the changes have been made and the submit button has been clicked, the list of activities will update and the component will disappear.

Create relaxed environment

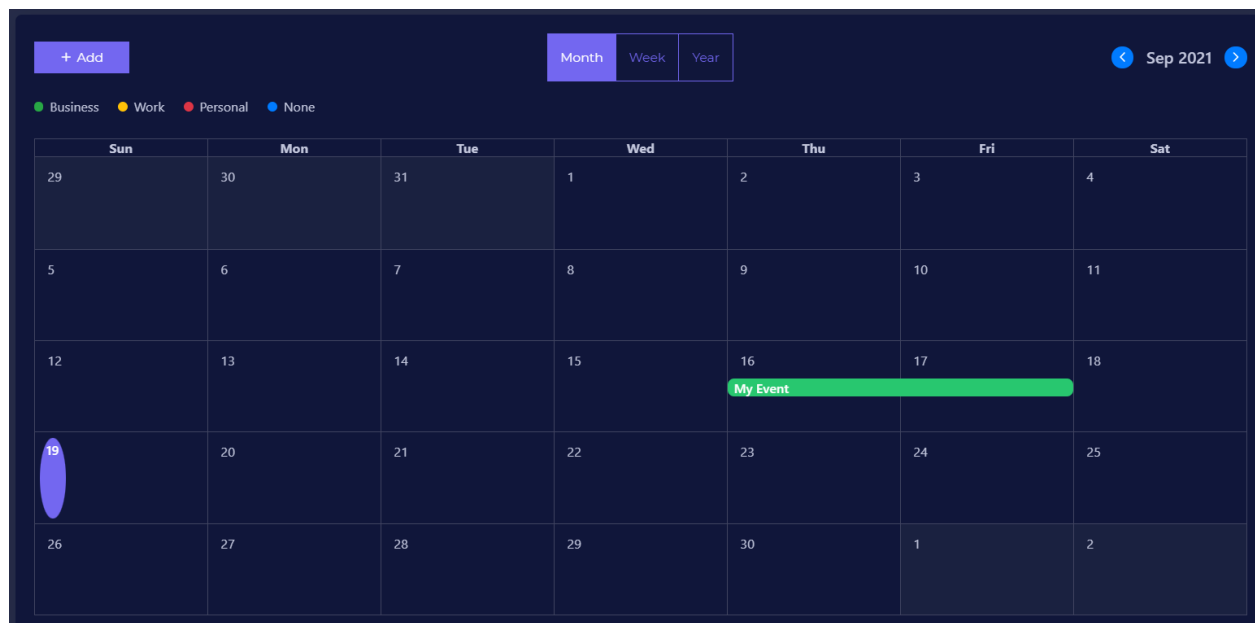


Figure 8: Calendar

Figure 8 shows the users calendar where they can add or edit events. The user can add an event by clicking on a date that will prompt a pop-up asking for the necessary information. The calendar can also be viewed in a “Month”, “Week” or “Year” view. When adding an event, users can select a tag that represents either that the event is “Business”, “Work”, “Personal” or “None”, this assists in distinguishing between events. When clicking on an event it will prompt a pop-up with the detail of that event.

According to Hill (2021) a calendar assists in giving a bigger picture on what has to be achieved. Users can plan out their sprints and add events such as meetings that they need to attend. This benefits in terms of setting out time to think and plan for the week ahead, thus creating a more relaxed environment.

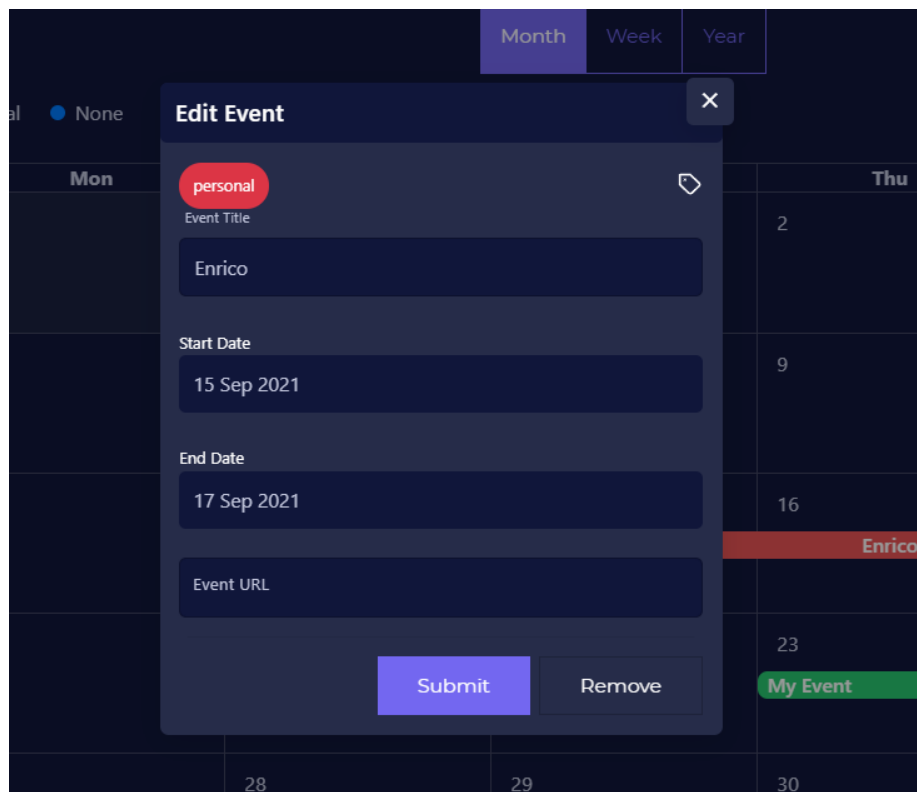


Figure 9: Calendar Edit Event

Figure 9 shows the pop-up when an event is selected. This shows the tag “Personal” as it is marked in red, along with the event “Title”, “Start Date”, “End Date” and “Event URL”. The user can also remove an event or edit a current event by clicking “Submit”.

User Experience comes first

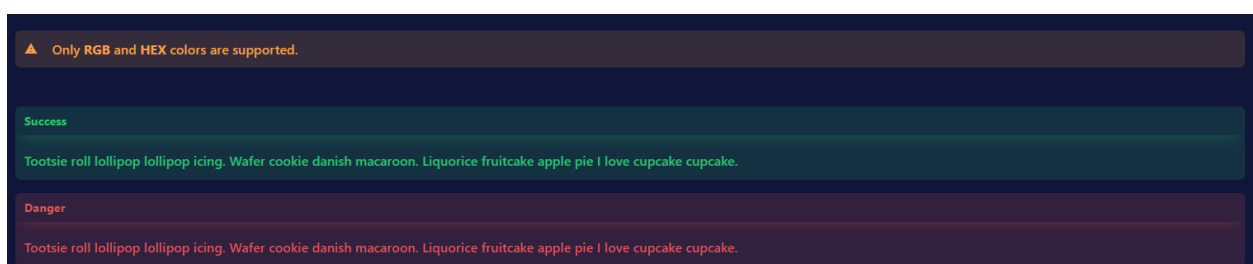


Figure 10: Guidelines for the user

Figure 10 shows dialog from the artefact, this allows for ease of use of the artefact. This requirement flows together with the human-computer interaction as user experience is important as it fulfils part of the user’s needs (Gangadharan, 2019). This includes all 10 rules as discussed in Chapter 3 of this study.

The system includes notifications when an action has happened successfully or unsuccessfully. The system has validation on each input of the user, as well as loading elements if the user must wait for data to be retrieved. The user also has the ability to change information that they saved incorrectly.

(iv) Evaluation

By following the criteria set in the awareness of the problem phase, deviations of what was expected are noted and must be tentatively explained. The result in this phase can lead to a new design because the criteria are not met.

(v) Conclusion

This phase is the end of the research cycle. The result of the research effort is typical, that of satisficing, where some deviations of the behaviour of the artefact are revised.

A.3. Empirical Study

Design science research was the most suitable research methodology to achieve the aims and objectives of this study through the creation of an artefact. The process model used in the study was the Vijay Vaishnavi (2004) process model. The process model established the design as a coherent discipline and aided in establishing in what phase the project was at any given time (Mohammad Abooyee Ardakan, 2009). The process model focused on the performance and development of artefacts, intending to improve an already functional artefact.

An evaluation to improve the communication using different communication methods and user interface design in a software development environment was done to gain knowledge on possible solutions to be added to the artefact. Ten human-computer interaction rules were identified and followed while developing and designing the artefact.

Feedback was gathered with the use of a semi-structured interview and analysed with the use of open coding. The data analysis resulted in five requirements and specifications, namely: improve communication, improve productivity, the artefact

should focus on communication between employees and communication about the project, create a relaxed environment and the user experience comes first. The human-computer interaction rules formed part of the requirement “user experience comes first”.

The goal of the study was achieved by presenting a web-application meeting all the requirements and specifications. The artefact can be used to enhance communication between developers and management at a South African software development company.

A.4. Reference List

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